

WHAT IS CLAIMED IS

1. An image retrieving apparatus for retrieving whether an image similar to a predetermined retrieving image to be retrieved is included in an input image or not comprising:

a first area extracting unit for extracting a first retrieving area having a first size from the input image with respect to each movement at a first moving pitch;

a first histogram forming unit for forming a first histogram with respect to each first retrieving area with a first resolution of gradation;

a second histogram forming unit for forming a second histogram of the retrieving image with the first resolution of gradation;

a second area extracting unit for comparing the first histogram with the second histogram for calculating a similarity of the first histogram with respect to the second histogram and for extracting a retrieving area having the similarity larger than a first level;

a third area extracting unit for extracting a second retrieving area having a second size from the first retrieving area extracted by the second area extracting unit at a second moving pitch;

a third histogram forming unit for forming a third histogram with respect to each second retrieving area with a second resolution of gradation which is higher than the first

resolution of gradation;

a fourth histogram forming unit for forming a fourth histogram of the retrieving image with the second resolution of gradation; and

an area retrieving unit for comparing the third histogram with the fourth histogram for calculating a similarity of the third histogram with respect to the fourth histogram and for retrieving an area having the similarity larger than a second level.

2. The image retrieving apparatus in accordance with claim 1 further comprising a memory for memorizing at least the second histogram and the fourth histogram which are previously formed by the second histogram forming unit and the fourth histogram forming unit.

3. The image retrieving apparatus in accordance with claim 1 further comprising a memory for memorizing at least the fourth histogram which is previously formed by the fourth histogram forming unit, and wherein the second histogram forming unit forms the second histogram from the fourth histogram memorized in the memory.

4. The image retrieving apparatus in accordance with claim 1, wherein the first moving pitch is larger than the second moving pitch.

5. The image retrieving apparatus in accordance with claim 1, wherein the first level used in the second area extracting unit is lower than the second level used in the area retrieving

unit.

6. The image retrieving apparatus in accordance with claim 1, wherein the second size is smaller than the first size.

7. The image retrieving apparatus in accordance with claim 1, wherein the retrieving image includes a human face portion.

8. The image retrieving apparatus in accordance with claim 1, wherein the image retrieving apparatus is a digital still camera further comprising an imaging sensor for forming the input image and an imaging controller for controlling an imaging process corresponding to a result of area retrieving by the area retrieving unit.

9. The image retrieving apparatus in accordance with claim 8, wherein the imaging controller controls an optical system for focusing the area retrieved by the area retrieving unit.

10. The image retrieving apparatus in accordance with claim 8, wherein the imaging controller controls an aperture value of an optical system and an exposing time for exposing the imaging sensor so as to be exposed the area retrieved by the area retrieving unit with a proper exposing quantity.

11. The image retrieving apparatus in accordance with claim 8, wherein the imaging controller adjusts color data with respect to the area retrieved by the area retrieving unit.

12. The image retrieving apparatus in accordance with claim 8, wherein the imaging controller executes an edging

process to an image data with respect to the area retrieved by the area retrieving unit.

13. The image retrieving apparatus in accordance with claim 8, wherein the imaging controller executes a gradation compensation to an image data with respect to the area retrieved by the area retrieving unit corresponding to the size of the area.

14. The image retrieving apparatus in accordance with claim 1, wherein the image retrieving apparatus is a printer comprising an imaging processor for executing imaging process to an image data with respect to the area retrieved by the area retrieving unit, and a printing unit for printing an image on a paper sheet with using the processed image data by the imaging processor.

15. The image retrieving apparatus in accordance with claim 14, wherein the imaging processor compensates output values of three principal color signals so as to make a luminance of an image with respect to the area retrieved by the area retrieving unit be a proper value.

16. The image retrieving apparatus in accordance with claim 14, wherein the imaging processor adjusts color data with respect to the area retrieved by the area retrieving unit.

17. The image retrieving apparatus in accordance with claim 14, wherein the imaging processor executes an edging process to an image data with respect to the area retrieved by the area retrieving unit.

18. The image retrieving apparatus in accordance with claim 14, wherein the imaging processor executes a gradation compensation to an image data with respect to the area retrieved by the area retrieving unit corresponding to the size of the area.

19. An image retrieving method for retrieving whether an image similar to a predetermined retrieving image to be retrieved is included in an input image or not comprising the steps of:

a first area extracting step for extracting a first retrieving area having a first size from the input image with respect to each movement at a first moving pitch;

a first histogram forming step for forming a first histogram with respect to each first retrieving area with a first resolution of gradation;

a second histogram forming step for forming a second histogram of the retrieving image with the first resolution of gradation;

a second area extracting step for comparing the first histogram with the second histogram for calculating a similarity of the first histogram with respect to the second histogram and for extracting a retrieving area having the similarity larger than a first level;

a third area extracting step for extracting a second retrieving area having a second size from the first retrieving area extracted by the second area extracting step at a second moving pitch;

a third histogram forming step for forming a third histogram with respect to each second retrieving area with a second resolution of gradation which is higher than the first resolution of gradation;

a fourth histogram forming step for forming a fourth histogram of the retrieving image with the second resolution of gradation; and

an area retrieving step for comparing the third histogram with the fourth histogram for calculating a similarity of the third histogram with respect to the fourth histogram and for retrieving an area having the similarity larger than a second level.

20. An image retrieving apparatus for retrieving whether an image similar to a predetermined retrieving image to be retrieved is included in an input image or not comprising:

an area extracting unit for extracting a retrieving area having a predetermined size from the input image with respect to each movement at a predetermined moving pitch;

a judging unit for judging whether a number of pixels included in the retrieving area is smaller than a predetermined value or not;

a first histogram forming unit for forming a first histogram with respect to each retrieving area with a first resolution of gradation, and for smoothing the first histogram when the number of pixels in the retrieving area is smaller than the predetermined value;

a second histogram forming unit for forming a smoothed second histogram of the retrieving image; and

an area retrieving unit for calculating a similarity of the first histogram of each retrieving area with respect to the second histogram by comparing the first histogram with the second histogram, and for retrieving an area having the similarity larger than a predetermined level.

21. The image retrieving apparatus in accordance with claim 20, wherein smoothing process in the first histogram forming unit and in the second histogram forming unit varies a value of degree of a specific gradation to be another value corresponding to a smaller one of values of degree of neighboring gradations of the specific gradation in higher gradation side and lower gradation side.

22. The image retrieving apparatus in accordance with claim 21, wherein the smoothing process varies the value of degree of the specific gradation in a manner so that a quantity of discrepancy between the value of degree with respect to the specific gradation and one of the values of degree of neighboring gradations of the specific gradation in higher gradation side and lower gradation side becomes equal to or smaller than a predetermined value.

23. The image retrieving apparatus in accordance with claim 21, wherein the specific gradation is a gradation having a positive value of degree, a ratio of the value of degree of the

specific gradation against a value of degree of gradation which is the nearest positive value in the lower gradation side is equal to smaller than a predetermined value.

24. The image retrieving apparatus in accordance with claim 21, wherein the smoothing process varies the value of degree of the specific gradation to a value on a straight line binding the values of degree of the neighboring gradations in the higher gradation side and the lower gradation side.

25. The image retrieving apparatus in accordance with claim 21, wherein the smoothing process further varies a value of degree of another gradation taking zero degree to another value with using positive values of degree of the nearest gradations in the higher gradation side and the lower gradation side.

26. The image retrieving apparatus in accordance with claim 25, wherein the value of degree of another gradation taking zero degree is varied to a value on a straight line binding the positive values of degree of the nearest gradations in the higher gradation side and the lower gradation side.

27. The image retrieving apparatus in accordance with claim 20, wherein the first histogram forming unit forms the smoothed histogram with a second resolution of gradation lower than the first resolution of gradation.

28. The image retrieving apparatus in accordance with claim 27, wherein the second resolution of gradation is a value of the number of pixels in the retrieving area divided by a

predetermined value.

29. The image retrieving apparatus in accordance with claim 20 further comprising a memory in which the second histogram previously formed by the second histogram forming unit is memorized.

30. The image retrieving apparatus in accordance with claim 20, wherein the judging unit further judges whether a number of pixels of the retrieving image is smaller than a predetermined value, and the second histogram forming unit forms the second smoothed histogram of the retrieving image when the number of pixels is smaller than the predetermined value.

31. The image retrieving apparatus in accordance with claim 30, wherein the first histogram forming unit and the second histogram forming unit respectively form the smoothed histograms with a resolution of gradation having a value which is divided a smaller one of the value of the number of pixels of the retrieving area and the value of the number of pixels of the retrieving image by a predetermined value when at least one of the number of pixels of the retrieving area and the number of pixels of the retrieving image is smaller than the predetermined value.

32. The image retrieving apparatus in accordance with claim 20, wherein the retrieving image includes a human face portion.

33. The image retrieving apparatus in accordance with claim 20, wherein the image retrieving apparatus is a digital still camera further comprising an imaging sensor for forming the input image and an imaging controller for controlling an imaging process corresponding to a result of area retrieving by the area retrieving unit.

34. The image retrieving apparatus in accordance with claim 33, wherein the imaging controller controls an optical system for focusing the area retrieved by the area retrieving unit.

35. The image retrieving apparatus in accordance with claim 33, wherein the imaging controller controls an aperture value of an optical system and an exposing time for exposing the imaging sensor so as to be exposed the area retrieved by the area retrieving unit with a proper exposing quantity.

36. The image retrieving apparatus in accordance with claim 33, wherein the imaging controller adjusts color data with respect to the area retrieved by the area retrieving unit.

37. The image retrieving apparatus in accordance with claim 33, wherein the imaging controller executes an edging process to an image data with respect to the area retrieved by the area retrieving unit.

38. The image retrieving apparatus in accordance with claim 33, wherein the imaging controller executes a gradation compensation to an image data with respect to the area retrieved by the area retrieving unit corresponding to the size of the area.

39. The image retrieving apparatus in accordance with claim 20, wherein the image retrieving apparatus is a printer comprising an imaging processor for executing imaging process to an image data with respect to the area retrieved by the area retrieving unit, and a printing unit for printing an image on a paper sheet with using the processed image data by the imaging processor.

40. The image retrieving apparatus in accordance with claim 39, wherein the imaging processor compensates output values of three principal color signals so as to make a luminance of an image with respect to the area retrieved by the area retrieving unit be a proper value.

41. The image retrieving apparatus in accordance with claim 39, wherein the imaging processor adjusts color data with respect to the area retrieved by the area retrieving unit.

42. The image retrieving apparatus in accordance with claim 39, wherein the imaging processor executes an edging process to an image data with respect to the area retrieved by the area retrieving unit.

43. The image retrieving apparatus in accordance with claim 39, wherein the imaging processor executes a gradation compensation to an image data with respect to the area retrieved by the area retrieving unit corresponding to the size of the area.

44. An image retrieving apparatus for retrieving whether an image similar to a predetermined retrieving image to be

retrieved is included in an input image or not comprising the steps of:

an area extracting step for extracting a retrieving area having a predetermined size from the input image with respect to each movement at a predetermined moving pitch;

a judging step for judging whether a number of pixels included in the retrieving area is smaller than a predetermined value or not;

a first histogram forming step for forming a first histogram with respect to each retrieving area with a first resolution of gradation, and for smoothing the first histogram when the number of pixels in the retrieving area is smaller than the predetermined value;

a second histogram forming step for forming a smoothed second histogram of the retrieving image; and

an area retrieving step for calculating a similarity of the first histogram of each retrieving area with respect to the second histogram by comparing the first histogram with the second histogram, and for retrieving an area having the similarity larger than a predetermined level.